

REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on August 13, 2003, and the references cited therewith.

Claims 1-27 are now pending in this application.

Information Disclosure Statement

Applicant submitted an Information Disclosure Statement and a 1449 Form on February 26, 2002. Applicant respectfully requests that initialed copies of the 1449 Forms be returned to Applicants' Representatives to indicate that the cited references have been considered by the Examiner.

Claim objections

Claim 2 was objected to for not further limiting claim 1, from which it depends. The Office Action indicates that the target loop transfer function is representative of the process and its selection is based upon at least a basic process model, as presented on page 9 of the application. This assertion is respectfully traversed. The target loop transfer function is selected based on the nature of the process, such as first order shape for a process that is stable in nature, as indicated on page 9, lines 9-11. Just indicating that the process is stable is not a model of the process, but a characteristic of the nature of the process. One cannot model a process just by saying it is stable. The target loop transfer function does not model the process, but rather serves as a shape to which gains are fit, as indicated on page 11, lines 13-18. Thus, the objection should be withdrawn.

§112 Rejection of the Claims

Claim 2 was rejected under 35 USC § 112, first paragraph, as failing to comply with the enablement requirement. The claims contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. This rejection is respectfully traversed.

The Examiner indicated that "G is the transfer function representative of the process 30 being controlled and constitutes a model of the process." The Examiner also indicates that there

is no proof that Equation 6 is equivalent to Equation 5. There is no requirement that an applicant provide proof that equations are equivalent. The application teaches that Equation 6 “allows one to directly tune the PID controller gains without the need for a model of the controlled process 30.” Proof of how it works is not required.

Further, the Examiner indicates that the loop transfer function is representative of the process and its selection is based upon at least a basic process model. As indicated above, the nature of a process is clearly not a model of the process. It cannot be used to control a process to a setpoint as would be required by a model. For purposes of applying prior art, the Office interpreted “without a model of the process” to mean “without requiring any structural information about the process dynamics other than knowledge of whether the process is self-regulating.” This appears to be taking official notice of a definition of a term that is clearly not consistent with the way the term is used in the present application. Applicant respectfully traverses this official notice and requests the Examiner to provide a reference that describes such an element. Absent a reference, it appears that the Examiner is using personal knowledge, so the Examiner is respectfully requested to submit an affidavit as required by 37 C.F.R. § 1.104(d)(2).

Claims 21-24 were rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. This rejection is respectfully traversed. As seen in FIG. 2, and text on page 6, the controller output signal K_e on line 20 includes the error signals summed at summation element 6 (Page 6, lines 21-23). Also, since L is the transfer function, and u is the input disturbance, the assumption that equation 6 is being minimized is clearly correct. Thus, it is respectfully requested that this rejection be withdrawn, as claim 21 is believed clear.

§102 Rejection of the Claims

Claims 1-12, 14-20 and 25-27 were rejected under 35 USC § 102(b) as being anticipated by Nishikawa et al. ("A Method for Auto-Tuning of PID Control Parameters", Automatica, 20(3), pp. 321-332, 1984). This rejection is respectfully traversed. A prima facie case of anticipation has not been established and the rejection should be withdrawn.

Section 4.1 of Nishikawa et al. was cited as providing a target loop transfer function. This assertion is respectfully traversed. Section 4.1 of Nishikawa et al. describes the use of a

weighted integral of squared error. This is simply not a target loop transfer function as described in the application and recited in each independent claim. As indicated above, the loop transfer function is not a model of the process, but in fact, describes the nature of the reaction of the process. Thus, Nishikawa et al. lacks an element of each and every claim, and the rejection should be withdrawn.

Claims 1, 2, 7-11 and 25-27 were rejected under 35 USC § 102(b) as being anticipated by Wang et al. ("New Frequency-domain design method for PID controllers", IEEE Proc.-Control Theory Appl., 142(4), 1995). A prima facie case of anticipation has not been established and the rejection should be withdrawn. This rejection is respectfully traversed. Wang et al. lacks at least one element of each of the independent claims.

Wang et al. describes how to design a PID controller, not modify gain parameters during operation. Wang et al., does not describe a method of determining new gains for a controller while the controller continues to control a process. It also does not describe the introduction of a disturbance while the controller continues to control a process.

§103 Rejection of the Claims

Claim 13 was rejected under 35 USC § 103(a) as being obvious over Wang et al. in view of Stoddard et al. (U.S. Patent No. 5,895,596). Claim 13 depends from claim 1, which is believed patentable over Wang et al. As such, it should also be allowable.

Claim 13 was rejected under 35 USC § 103(a) as being obvious over Wang et al. in view of Grassi ("Proportional-Integral-Derivative Controller Tuning by Frequency Loop-Shaping", Ph.D dissertation, Arizona State University, 1999). Claim 13 depends from claim 1, which is believed patentable over Wang et al. As such, it should also be allowable.

Claim 14 was rejected under 35 USC § 103(a) as being obvious over Wang et al. in view of Ho et al. (U.S. Patent No. 5,587,899). Claim 14 depends from claim 1, which is believed patentable over Wang et al. As such, it should also be allowable.

Claim 21 was rejected under 35 USC § 103(a) as being obvious over Wang et al. in view of Grassi et al. ("PID Controller Tuning by Frequency Loop-Sharing", Proc. 35th Conference on

Decision and Control, Japan, 1996). Claim 21 depends from claim 1, which is believed patentable over Wang et al. As such, it should also be allowable.

Claims 22-24 was rejected under 35 USC § 103(a) as being obvious over Wang et al. in view of Grassi et al. ("PID Controller Tuning by Frequency Loop-Sharing", Proc. 35th Conference on Decision and Control, Japan, 1996) and in further view Nishikawa et al. Claims 22-24 depend from claim 1, which is believed patentable over Wang et al. As such, it should also be allowable.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (612) 373-6972 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 13 day of November, 2003.

Gina M. Uphus

Name



Signature